

#### ABSTRACT OF THE DISCLOSURE

The invention provides methods of introducing heterologous cells into fish. After introduction cells remain viable, and in some instances proliferate, for sufficient time to conduct a variety of analyses on the heterologous cells or the fish or 5 both. Such methods are useful for screening potential drugs for toxicity toward introduced cells or for capacity to stimulate differentiation and/or proliferation of introduced cells. Such methods are also useful for diagnosing the presence of small quantities of cancerous cells or pathogens in patient tissue samples. Such methods are also useful for culturing cells for subsequent use in cell or tissue engineering.